

the Korean Seas, that whilst a large proportion of the Asteroids point to a northern centre of derivation, the Echinoidea, on the other hand, all belong to species having a southern and westward area of distribution.

DESCRIPTION OF PLATE VIII.

- Fig. 1. *Astropecten formosus*. Abactinal aspect, natural size.
2. Actinal side of same specimen, about the middle of a ray, $\times 10$.
 3. Arrangement of the foot-papillæ on the inner portion of the ambulacral furrow, $\times 10$.
 4. Abactinal side of same specimen, about the middle of a ray, $\times 10$.
 5. *Cribrella densispina*. Abactinal aspect, natural size.
 6. Actinal side of same specimen, about the middle of a ray, $\times 10$.
 7. Arrangement of the foot-papillæ, seen somewhat obliquely, and more highly magnified.
 8. Abactinal side of same specimen, about the middle of a ray, $\times 10$.
 9. Madreporiform body of same specimen, $\times 10$.
 10. *Temnopleurus torcumaticus* (Klein), Ag. (?), juv.; profile, natural size.
 11. Actinal aspect of same specimen, natural size.
 12. Portion of test of same specimen, $\times 10$.
 13. Apical disk of same specimen, $\times 10$.
 14. *Echinocardium australe*, Gray. A young specimen 7.75 millims. in length; abactinal aspect, $\times 5$.
 15. Actinal aspect of same specimen, $\times 5$.
 16. Longitudinal profile of same specimen, $\times 5$.
 17. Portion of the posterior end of the test of same specimen, showing the separation of anal and subanal fascioles, magnified.

ON some Ophiuroidea from the Korean Seas. By Professor P. MARTIN DUNCAN, M.B. (Lond.), F.R.S., &c. (Communicated by W. PERCY SLADEN, Esq., F.L.S.)

[Read June 6, 1878.]

(PLATES IX.-XI.)

- I. Introduction and General Relations of the Fauna.
- II. List of Families, Genera, and Species.
- III. Description of the New Species, and notices of those hitherto known.
- IV. Remarks on the Species, and on their Affinities.;
- V. Description of the Plates.

I. *Introduction and Relations of the Fauna.*

CAPT. St. John, R.N., in his late voyage in and about the seas to

the south and east of the Korea, dredged up numerous specimens of small Ophiurans, which were in company with several Asteroidea and Echinoidea. Dr. J. Gwyn Jeffreys sent me some of these specimens; and finding them very interesting, I was glad to avail myself of Dr. Günther's kindness when he placed in my hands the part of Capt. St. John's collection that had been sent to the British Museum, with a view to its being examined and named. Mr. Percy Sladen undertook, at my suggestion, the examination of the Starfish and Echini; and this communication is the result of my work on the Brittle-stars.

Situated near land which is rarely visited by Europeans, the Korean seas are to the south-west of the Japanese islands, to the north and rather to the east of Formosa; and the Philippines are many degrees to the south and a little to the west. Their floor was virgin ground to the dredger; and it was reasonably anticipated that some remarkable forms would be discovered in the fauna. It was interesting to notice, as the specimens were brought under careful examination, how several distant Ophiuran faunas were associated together, and represented not so much by identical as by very closely allied species. The peculiar grouping of certain genera very characteristic of well-known areas was to be traced in the fauna of this out-of-the-way locality.

One group of genera was not without its resemblance to those of the remote Smith's Sound and the North Atlantic; another recalled the familiar forms of the West-Indian seas; and a community of species with the Red Sea was noticed.

Out of the 16 species and several varieties, only three had previously been described from other localities, namely:—*Ophioglypha sinensis*, Lyman, from the China seas and Philippines; *Ophionereis dubia*, from the Red Sea and the Philippines; and *Ophiactis sexradia*, from the Pelews and Philippines, Nicobars and Tahiti.

Three of the new species of *Ophioglypha* belong to the group of the genus which contains the species *O. Stuwitzii*, *O. albida*, and *O. nodosa*; but they may be readily distinguished from these northern forms. The new *Ophiacantha* is interesting from its belonging to a genus of which a species is so commonly associated with the Greenlandic *Ophioglyphæ*; but it has characters which ally it to *Ophiacantha stellata*, Lyman, from Barbadoes. And the common *Ophiolepis* of the Korean seas, whilst having some abnormal characters, is not without some resemblance to the

immature *Ophiopholis*, the common associate of the well-known forms just mentioned. The group of *Amphiuræ* and *Hemipholis*, to which the Korean specimens belong, is characterized by the small number of mouth-papillæ; and they are allied to *Amphiura filiformis* and *A. squamata*, both Atlantic forms. The new species of *Ophionereis* and *Ophiothela* I have also recognized in a small collection of undescribed *Ophiuræ* from the Red Sea. The *Ophiothrix* of the Korean seas, with its numerous glassy spines and extremely variable disk and colour, does not come within any of the specific diagnoses of that very large genus, which is so fully represented in the Philippine seas.

Lyman and Lütken, especially, have shown the mimeticism and the similarity of generic and specific groupings of Ophiuroidea on both sides of the Isthmus of Panama, and the interesting representative character of the Ophiuroid faunas of the eastern African seas and of seas around the islands of the Pacific.

Having this world-wide distribution of closely-allied forms to deal with, it is not surprising that the difficulty of discriminating the species of large genera should be great. To this difficulty is added the extremely unsatisfactory multiplication of genera that has taken place, specific attributes often being regarded as generic, and parts of the generic diagnoses being frequently applicable to the type species and no other. It has been necessary to modify one genus, and to suggest the absorption of another after the examination of the form which I have termed *Ophiolepis mirabilis*: and in the instance of *Hemipholis microdiscus* a part of the Agassizian diagnosis must be discarded. One of the *Ophioglyphæ* is very like an *Ophiomusian*; and the remarks upon it will be found after the description of the species.

The fauna of Ophiuroidea, the result of dredging over a wide sea-floor, if it is an average of the whole, denotes conditions unfavourable to the large growth of individuals. The number of genera (ten) is small; and the excess of *Ophioglyphæ* is as remarkable as is the absence of several genera common in the Pacific. Thus *Ophioenemis*, *Ophiopeza*, *Ophioplocus*, *Ophiocoma*, *Ophiarachna*, *Ophiarthrum*, *Pectinura*, and *Ophiopsammium* are not represented.

As a whole, the fauna is that of shallow water.

II. *List of Ophiurans collected in the Korean Seas.*

Order OPHIURÆ, J. Müller.]

Family OPHIOLEPIDIDÆ, Ljungman*.

Genus OPHIOGLYPHA, Lyman.

1. *Ophioglypha Forbesi*, sp. nov. 4. *Ophioglypha Sladeni* †, sp. nov.
 2. *O. striata*, sp. nov. 5. *O. sinensis*, Lyman.
 3. *O. sculpta*, sp. nov.

Genus OPHIOLEPIS, Lyman (amended).

1. *Ophiolepis mirabilis*, sp. nov.

Family AMPHIURIDÆ, Ljungman.

Subfamily OPHIONEREIDINÆ.

Genus OPHIONEREIS, Lütken.

1. *Ophionereis dubia*, Audouin, var. 2. *Ophionereis variegata*, sp. nov.

Subfamily AMPHIURINÆ, Ljungman.

Genus AMPHIURA, Forbes (modified).

1. *Amphiura Lütkeni*, sp. nov. 2. *Amphiura koreæ*, sp. nov.

Genus HEMIPHOLIS, Agassiz.

1. *Hemipholis microdiscus*, sp. nov.

Genus OPHIACTIS, Lütken.

1. *Ophiactis sexradia*, Grube. 2. *Ophiactis affinis*, sp. nov.

Subfamily OPHIACANTHINÆ, Ljungman.

Genus OPHIACANTHA, Müller & Troschel.

1. *Ophiacantha Dallasii* †, sp. nov.

Family OPHIOTRICHDÆ, Ljungman.

Genus OPHIOTHRIX.

1. *Ophiothrix koreana*, sp. nov. 2. *Ophiothrix koreana*, varr. nov.

Genus OPHIOTHELA, Verrill.

1. *Ophiothela Verrilli*, sp. nov.

Total species 16.

Species known before, from other localities.

1. *Ophioglypha sinensis* Hong-Kong.
 2. *Ophionereis dubia* Red Sea.
 3. *Ophiactis sexradia* Philippines.

* Ofversigt af Kongl. Vetenskaps-Akademiens Förhandlingar, 1866, p. 303.

† Named after my friend Mr. W. Percy Sladen.

‡ In recognition of Mr. W. S. Dallas, Assistant Secretary of the Geological Society.

New species.

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| 1. <i>Ophioglypha Forbesi.</i> | 8. <i>Amphiura koreæ.</i> |
| 2. <i>O. striata.</i> | 9. <i>Hemipholis microdiscus.</i> |
| 3. <i>O. sculpta.</i> | 10. <i>Ophiactis affinis.</i> |
| 4. <i>O. Sladeni.</i> | 11. <i>Ophiacantha Dallasii.</i> |
| 5. <i>Ophiolepis mirabilis.</i> | 12. <i>Ophiothrix koreana</i> and varieties. |
| 6. <i>Ophionereis variegata.</i> | 13. <i>Ophiothela Verrilli.</i> |
| 7. <i>Amphiura Lütkeni.</i> | |

III. Description of the Species.

Genus OPHIOGLYPHA, Lyman.

1. OPHIOGLYPHA FORBESI, sp. nov. Plate IX. figs. 1, 2, 3.

A very Ophiomusoid-looking form, but having tentacles as far out on the arm as the seventeenth plate.

The disk is pentagonal, rather thick, flat above, and is notched for the arms, which are slender and tapering. The scales on the upper part of the disk are large, few in number, and very regularly placed; there is a rosette, the central scale being pentangular, and the others are larger and rounder, and two large rectangular scales reach from its circumference to the interradiial space, which is filled by them, and one even bends downwards below the upper margin. One or two very small scales are at the edges of these larger. A small scale separates the radial shields within. The radial shields are large, about as broad as long, curved at the free side, straight at the edge over the arm, united by the greater part of their inner side, and broad and blunt at their end near the rosette. The notch for the upper arm-scale is small, and there is some swelling of the shields near their junction. The radial scales are large, long and broad, and the curved free edge is armed with about ten or more short, distinct spinules, which, diminish in size as they merge into some very minute ones at the edge of the generative plate, close to the mouth-shield.

The interbrachial space, below the margin of the disk, is occupied by a large scale, which reaches to the distal edge of the mouth-shield: there is a small scale with a slight boss on it between this scale and the generative plate. The mouth-shields are large, occupy nearly the whole of the space between the arms, and are longer than broad; they are broad without and rounded; the sides are long and rather straight; and quite within there is an angular process with a sloping rounded shoulder, which forms the sides

and bounds the generative slit. The side mouth-shields are large and oblique, rather broad, and are united at their inner edge, which is produced between the jaws; the aboral edge is in contact with the angular process of the mouth-shield.

The jaws somewhat resemble the side mouth-shields in shape; they are short, wide apart without, are united within, and are rather projecting downwards. The mouth-papillæ are broad, short and close, and the innermost of each angle is small and diamond-shaped. The others, equal in height, form a linear surface, which is continuous, and the separation of the papillæ is only indicated by faint line. The outermost is the broadest, and there are in all eleven to each angle including that at the apex.

The outer end of each jaw reaches to the opening for the tentacle, or to the side of the first lower arm-plate.

The lower arm-plates.—All are separate, from the union of the side-plates in the median line. The first, although differing in shape from the others next in succession, is as large as they are; it is very peculiar in shape, being something like that of the blade of a hatchet. The margin within is narrow and notched, the outermost teeth fitting therein. The sides are re-enteringly curved, and within they bound the tentacle-opening and support three close, short tentacle-scales, and without they expand, where the plate becomes broad at its distal end, which is broadly curved, with rounded edges.

The next plate is broader than long, angular within, curved without slightly; and the sides, in one part rather straight, become curved where the side-plate passes obliquely to join its fellow along the median line. The third lower arm-plate is not so broad as the second, and has the same general shape. At about the twelfth or thirteenth lower arm-plate the size is much diminished, and the plate ceases to be recognized at about the twentieth joint, which is close to the tip.

The side arm-plates unite below along the median line and separate the first lower arm-plate from the second, and the second from the third very definitely; and from this point the length of the junction increases, and is greater than the length of the lower arm-plate. Further down, the side arm-plates nearly form the whole of the joints; they are broad and spread out wider without than within. A small, short, subspiniiform tentacle-scale is on each side-plate, just external to the side of the lower arm-plate; its direction is longitudinal, and it protects a long slender

tentacle. The tentacle-scale becomes microscopic towards the seventeenth joint, and minute tentacles are seen thus far out.

The first tentacle-opening, slightly curvilinear, has four broad, but short, close, straight-edged tentacle-scales, two on either side. The next has a short ridge and a spiny scale on the side arm-plate, and a raised rim on the lower arm-plate; and the third has a small scale on the side arm-plate alone.

The upper arm-plates near the disk are boss-like. There are two small plates within the notch which are broader than long, close and convex from side to side. The next plate is overlapped slightly by the second, is boss-like and convex, strongly rounded without, and the sides slope in towards the disk. The fourth upper arm-plate is separated from the third by the side arm-plates, and is irregularly heart-shaped and boss-like and convex, especially distally; it forms about one half of the breadth of the joint, the rest being made up by the expanded distal part of the side-plates. The succeeding upper arm-plates diminish in size in all directions, and become more angular; and the last is seen on the twelfth or thirteenth joint.

The upper parts of the side arm-plates unite in long median lines; they are constricted within and expanded distally. Three very short stumpy arm-spines are in a depression on the side of the plate, close to the edges. The upper spine is the smallest, and they are unequally distant.

Locality. Korean Straits, 51 fathoms. Collected by Capt. St. John, R.N.

Ljungman has established the genus *Ophiothyreus* in order to separate one species, *O. Goesi*, Lj., from *Ophiomusium*, Lyman (see Stockholm Öfversigt af Kong. Vet. Förh. 1871, published in 1872, årg. 28, pp. 619, 620). This genus is characterized, amongst other peculiarities, by papillæ, some fifteen in number, projecting downward on the margin of the innermost arm-plate ("margine ad scutellum brachiale intimum vergenti papillifero"). The innermost upper arm-plate, large and triangular, is divided into two parts—the under arm-plates "inter sese tangentia," and the side arm-plates "ad brachium medium versus primum inter sese paullum tangentia." There are two squamiform ambulacral papillæ "ad ternas," and two minute arm-spines reaching, like the papillæ, to the third plate only.

This genus has Ophiomusoid characters, especially in the absence of the tentacles from the distal arm-divisions; but the

divided upper arm-plate suggests, according to Ljungman, the alliance with *Ophiolepis*. It is not without affinities to *Ophioglypha*, but it differs materially and generically from the new form described above.

OPHIOGLYPHA STRIATA, sp. nov. Plate IX. figs. 4, 5, 5a.

AN *Ophioglypha* with striæ on the proximal side margin of the side arm-plates.

The disk is pentagonal, thick, flat above, straight and high in the interbrachial spaces, strongly notched for the arms; and the numerous scales are flat, overlapping, and inconspicuous. The central scale is large, and is surrounded by five small ones, succeeded by five large and some small scales, the rosette being indistinct. A medium-sized scale separates the radial shields at their inner angle; numerous scales pass towards the interbrachial space, where there is a central line of large ones bounded by two rows of smaller scales.

The radial shields, small and irregular in shape, are separated within, are then united for a short space, and are parted externally by the long convex upper arm-plate, which is fringed with a row of rudimentary spines at the sides. Sunken at the edges, the shields, about as long as broad, are bounded aborally by a straight or by a curved edge, into which the large radial plate fits on either side. In young specimens a small plate occurs, besides the first arm-plate in relation to the radial shields, and fills up the angle more or less; but with growth this becomes an important plate, and is not then distinguishable from the first arm-plate.

The radial plates are rounded, large, tall from below upwards on the side of the arm, broad above and narrow below, where they seem to merge into the generative plates. They form a conspicuous part of the interbrachial space, and are armed with about fifteen short spines, which are sharp and distinct above, and which unite and form broad expansions below.

The convex upper arm-plate, the rounded radial plates, and the colour (a faint grey) of the radial shields renders the parts over the insertion of the arms very remarkable.

The mouth-shields are large, occupy nearly all the space below and between the arms, and even are bent upwards slightly at the lower part of the tall interbrachial space; they are longer than broad, broadest and roundly curved aborally, narrower and more sharply curved orally, where there is a slight point, and the sides

are rather straight without, and converge more definitely within. All are slightly convex, and the madreporic is the largest.

The side mouth-shields are small; they are largest near their inner junction, and they have a round small outer lobe, which bounds the first tentacular opening aborally. The jaws are broad, short, and are tumid near the plate, and they support numerous mouth-papillæ. There are from eleven to thirteen papillæ, all of which are small, to each mouth-angle: the first resembles a true tooth, is the longest, and is angular and sharp; the next are smaller and are rounded, and the others are mostly little narrow bands, more or less separated, here and there, and rounded. There are four teeth, which are long, flat, narrow, and pointed.

The arms, five in number, are about once and a half the length of the diameter of the disk; they are broad and high at the disk, and taper gradually, and retain their great development at the sides to their tip.

The lower arm-plates within the disk have a more or less bold longitudinal convexity with a broad expansion on either side aborally. Broadest without, the plates are curved and are slightly hexagonal, the side arm-plates being joined to the small margins on either side of the distal end, and the rest of the side giving support to the curved, short, flap-like set of ambulacral papillæ.

Beyond the disk the lower arm-plates lose the convexity, are at first about as long as broad, and then become longer towards the tip of the arm. They are hexagonal and broadest aborally, and the oral edge, nearly straight, is the broadest, the opposite one diminishing gradually to a point where the side arm-plates come in contact, very close to the end of the arms. At that part the lower arm-plate is more elongato-quadrangular and broadest aborally.

The lower arm-plates support on either side, aborally, a row of thin, short, curved, flap-like processes, which are tentacle-scales. They are usually five in number, are close, split up often and very irregular; but those which are nearest the aboral part of the plate are the largest, and the others diminish rapidly in size. These scales diminish in size and number rather rapidly towards the mid arm, where there is a rudimentary tentacle-scale, and it is lost towards the tip.

The upper arm-plates vary much in shape and size; the first, in the larger specimens, is within the angle of the radial shields, and is rather convex, about as long as broad, rather pointed, and

with curved sides within, and with straight sides and a straight or curved edge aborally. In small specimens there is a small scale quite in the angle of the radial shields. A ridge, more or less dentated with minute spines, is on each side, and it is continuous with one on the next arm-plate, and it merges into the upper spines of the side arm-plate. The second arm-plate is broader than the other, broadest and curved without, with sides sloping to the smaller oral end. The next plate, also nearly quadrangular, is broader than long, slightly curved without, and nearly straight within. The fourth plate is hexagonal, broader than long, broadest without; and the edges are straight at the sides, and curved elsewhere slightly. The other upper arm-plates are hexagonal, longer than broad, with the greatest width externally; and towards the tip the length increases and the edges within and without become almost points. All are slightly convex from side to side, giving a keeled shape to the top of the arm.

The side arm-plates are important members of the arm; but they form the tall sides, and but little of the upper and lower surfaces. They are therefore tall, broad, and slightly curved at the free edges. They lie close to the side of the arm, where their breadth is very equal; and on their oral side, beneath the overlapping, ill-developed, semilamellar spines of the outer edge of the antecedent plate, there is a row of *linear striations* corresponding apparently with the spines. Above, there is an angular process of the side arm-plate which articulates with the sides of the upper arm-plates; and quite at the end the side arm-plates meet above.

On the lower part of the arm a very slender process of the side arm-plate is in contact externally with the second lower arm-plate; and the next and following side arm-plates join the lower arm-plate on the increasingly wide distal lateral side of the hexagon. In mid arm the side arm-plates encroach more on the arm-plates, and finally near the end separate them and unite. They form much of the under part of the arm; and they are swollen and convex towards the under part of it. The tentacle-openings down the arm are rather large, linear and broad, and increase in size towards the disk. Low down the arm there are only rudimentary tentacle-scales on the side arm-plates. The spines are on the edge of the side arm-plates, and do not project outwards; they are thin, lamellar, or rarely pointed, and are numerous occasionally when the ordinary lamellar condition is split up.

The tentacle-opening nearest the mouth-angle is large, oblique, and linear, and there is a margin of about from ten to twelve short and broad, blunt, lamellar tentacle-scales, one half being on the lower arm-plate. The next opening has about six scales on the side arm-plate; and so has the third. The tentacle-scales gradually merge into ordinary spines along the edge of the succeeding side arm-plates, and gradually become fewer and fewer.

The diameter of the disk between opposite interbrachial spaces is $\frac{3}{10}$ inch, and the length of the arm is about $\frac{5}{10}$ inch.

Locality. Sondai Bay, Korean Sea. Collected by Capt. St. John, R.N.

In the British Museum.

OPHIOLYPHA SCULPTA, sp. nov. Plates IX. & XI. figs. 6, 7, 8, & 35.

The body is thick, pentagonal in outline, with well-marked slits for the arms, which are broad and high near the disk, tapering and short, being never more than once and a half the length of the diameter of the disk.

The upper surface of the disk is covered with large, medium-sized, and a very few small, overlapping, stout, rather tumid scales, which are often marked with minute dot-like cavities, and with short straight furrows close to the edge. A central rosette is formed of six, close, large plates, without any others intervening; the central plate, somewhat irregular in shape, is not overlapped. There are two large scales placed radially, which reach from the rosette to the edge of the disk in each interbrachial space; and three small scales, running parallel with the rosette, reach from it to the proximal separation of the radial shields, into which the central one fits. The radial shields are small, irregular in shape, are much overlapped, and are largest and broadest at the notch without; they are united and even overlap for a short space, and are narrow within. They are tumid, rounded off, and marked with pits.

The interbrachial spaces are large, slightly re-enteringly curved, and slope inwards and downwards. They are covered by numerous, small, very projecting, tumid scales in mosaic, and are much furrowed from side to side. A comb of very small, sharp, slender spinules is on the radial scale on either side of the notch, and it is continuous below with a spined edge of a generative plate. There are about twenty to twenty-four spinules.

The mouth-shields are small, longer than broad, very prolonged and angular within, and broad and nearly circular without: there

is a slight shoulder where the angular part joins on to the rest, on either side, and it marks the line of contact, without, of the side mouth-shield and the end of the wide generative opening. The angular part is enclosed by the obliquely placed side mouth-shields, which are joined within broadly, and which are rather swollen.

The jaws form a short broad angle, and are rather swollen longitudinally close to the mouth-papillæ. There are three small spiniform mouth-papillæ at the apex—one at the angle over the teeth, and one on either side. The other papillæ are long, low, thin ridges, sometimes separated slightly into four indefinite masses on either side, that nearest the spiniform teeth being pointed. The papillæ are small. There are five teeth, the uppermost being the largest; they are small, narrow, projecting, flat and spear-headed.

The upper arm-plates.—The first, seen close to the notch and within the radial shields, is rudimentary. It is a broad, very short lamina, with some rudimentary spinules upon it on either side. The second is small, broader than long, curved without (re-entering), and tumid; it carries spinules on its sides. The third, much larger, and often the largest on the arm, is broader than long, broadly heart-shaped, the broad rounded angle within being sometimes overlapped, and the large distal curve is produced to a slight angle on either side. The seventh plate is pointed and angular within, and much rounded without; length and breadth nearly equal; and it is separated from the eighth by a slight median union of the side arm-plate. At the end of the arm the upper arm-plates are greatly separated, are broader than long, and heart-shaped, forming a minute prominence. The plates near the base of the arm are swollen, especially distally, and the surface is marked by minute radiating lines.

The under arm-plates.—The first is about as long as broad, smallest and bluntly angular within, largest and re-enteringly curved without, and more or less triangular, with the angles cut off or curved; the centre of its surface projects slightly. The second plate is larger, nearly square, with curved corners, narrowest within, sloping at the sides, projecting in the middle, and marked with short furrows; its proximal edge is slightly curved towards the disk, and the edge, without, has a very faint notch and a broad shallow re-entering curve. The third plate, squarish, is broadest without, and the next has a very decided distal curve. All project and are marked at the sides. The eighth is small,

broader than long, angular and sharp within, curved broadly without, with short straight sides; it is convex, and separated from those next to it by the side arm-plate junction. Towards the tip of the arm the lower arm-plates are very small, widely separated, and about as broad as long, angular within and broadly curved without.

The side arm-plates are largely developed and form much of the arm. They are long, broad, stout, and flap-like, standing away from the arm at the base, especially below. They are closer to the arm lower down, are convex and swollen, and have large slits between them. They meet below between the seventh and eighth lower arm-plates, and gradually form much of the lower surface of the arm. They form the whole of the thick side of the arm and a large portion of the upper surface also. Above, they are close to the arm, are swollen and long, and their distal edge is curved gracefully. They unite between the seventh and eighth plates, and form much of the end of the arm. There are eight spines on the third side arm-plates; and they are not quite on the middle of the free edge, but on its outside, the tentacle-scales being nearer the other edge. The spines are very short, often flat, rounded and sharp, unequal, and some are broader than others. Towards the end of the arm there are five subequal spines, all very short.

Tubercle-scales.—The tentacular opening, at the side of the first lower arm-plate, is long, and there are four moderate-sized scales on either side of it; the second, not so long, has three more or less perfect, flat, short, rounded tipped scales on the side arm-plate, and two on the side of the lower arm-plate. About the sixth or seventh plate there is a tentacle-scale on the side arm-plate and on the lower arm-plate; and then they frequently, but not invariably, cease to be noticed, the small one on the side arm-plate often remaining.

A smaller specimen than the type, and having the disk about one half the size, shows some variation in structure which should be noticed.

The principal disk-scales are represented, but are slightly compressed; they have the patterns of dots and furrows on them. The first and second upper arm-plates have spines on them; and the side arm-plates unite, either between the fourth and fifth or the fifth and sixth upper arm-plates. Beneath, the tentacle-scales are carried on nearly to the end of the arm on the side arm-plate,

but only to the sixth or seventh lower arm-plate; and their lamellar nature is remarkable. The mouth-plates are more distinct.

Several still smaller specimens show the general arrangement of the disk-scales, have a spine here and there on the second upper arm-plate, and the side arm-plates unite above between the second and third upper arm-plates. Beneath, the tentacle-scale ceases on the fifth lower arm-plate, and the side arm-plates join between the third and fourth or fourth and fifth lower arm-plates. The jaws are thicker and the mouth-papillæ are less developed than in the larger forms. There is a tendency of the tentacular scales to form ridges, and of the spines to split.

Locality. Korean Straits, 23 fathoms. Collected by Capt. St. John, R.N.

In the British Museum.

OPHIOGLYPHA SLADENI, sp. nov. Plate IX. figs. 9, 10, & 11.

The disk is pentagonal, thick, much notched above the arms, which are short, straight, and tapering, and not quite twice as long as the diameter of the body.

The upper surface of the disk is covered with numerous rather tumid scales of all sizes, disposed without much regularity, sometimes overlapping and usually in mosaic. A large central scale is circular in outline, and has a slight boss on it, and four large scales of the rosette with a small one surround it, being separated by smaller scales. Each of the outer large scales has three smaller ones on its distal edge, the central scale of the three being fixed in between the radial shields.

The radial shields are longer than broad, have their inner and outer ends nearly equal, and their inner sides united for a short space, and the outer sides are curved; separated slightly orally by one scale, they are widely apart without and are placed obliquely. The shields do not reach the margin of the disk, and each terminates without in a long radial scale, curved without and furnished with fourteen close, distinct, short, slender spines. The interbrachial spaces are straight and they are boldly scaled. The mouth-shields are large, and reach without, close to the vertical margin of the interbrachial spaces; they are longer than broad, with a very pointed angle within and a broad curve without, the sides sloping from the broad base to the sharp angle.

The side mouth-shields are small, short, narrow, and united at

their inner edge; they are in contact with the distal third of the mouth-shield, and reach the generative slits.

Jaws short and converging; tooth-plate large; mouth-papillæ eleven to each angle. They are small, short, and the outer are broad; the innermost is sharply rounded and spearhead-shaped, and the next are smaller and sharper, the others resembling the outermost. There are four teeth, which are long, narrow, thin, and rounded.

The lower arm-plates are small, have a central longitudinal projection, are longer than broad, and have flat sides. The first is the largest, and the next few are close, slightly broadest and curved without. In mid arm (twelfth plate) they are elongated heart-shaped or verging on the hexagonal, and are slightly separated by the side arm-plates.

The upper arm-plates.—The first and second are within the notch: the one is very small, triangular, curved without, narrow within; and the other, much longer, is nearly square, and convex from side to side. The third, shorter than the second, is broader than long, is slightly overlapped by the second, convex from side to side, especially at its distal end, where it is curved. The fourth, broader than long, is broadly curved distally, where it is prominent and convex; it is narrower within, the proximal edge being overlapped by the third plate. The succeeding plates become more and more angular within, are broadly curved and projecting without, and are longer than broad. At the tip the plate is very small and heart-shaped.

The side arm-plates widely separate the others at the tip of the arm, and separate the upper plates slightly at about the eighth joint; and the fourth upper plate is encroached upon by the prominent broad flaps of the side arm-plates. The side arm-plates are, on the whole, well developed, for the arms have large sides; they have large flaps, which are tumid and swollen below and convex above; they are close to the arm.

Their free edge has spines on it, which are directed towards the end of the arm, and near the disk, on the side of the arm, on several side arm-plates, there is a solitary, sharp, short spine on the body of the plate and remote from the others. On some side plates it is close to the other spines. The spines on the edge are short, small, close, sharp, slender, and some are flat; they are rather irregular in breadth and length, and a long one is usually innermost on the top of the arm. Beneath, one or two spiculate sharp spines, longer than the others,

are seen external to the tentacle-scales. There are eleven spines on the fourth plate, and further out they are six and then four in number. The tentacle-openings are large and long : the first has four or five close, short, rounded scales on either side ; and the second has five subspiniform scales on the side arm-plates, and four small blunt ones on the lower arm-plate ; the next opening has the same number of scales, and then four are found around some, the number diminishing to one. The flat scales on the lower arm-plate cease at the sixth, where they are nearest its distal end.

Locality. Korean Sea. Collected by Capt. St. John, R.N.
In the British Museum.

OPHIOGLYPHA SINENSIS, *Lyman, Illust. Cat. Harvard Mus.*
no. vi. p. 12 (1871).

Many small specimens of this species were found in 40 fathoms in the Korean Strait by Capt. St. John, R.N.

In the British Museum.

Genus OPHIOLEPIS, *Müll. & Troschel.*

OPHIOLEPIS MIRABILIS, sp. nov. Plates IX. & X. figs. 12, 13, 14.

The disk is large, swollen above, circular in outline, and without arm-notches. The arms not more than twice the diameter of the disk in length, are broad at the disk and taper rather suddenly, becoming small towards their ends.

Above, the disk is covered with scales of different sizes and shapes ; they and the radial shields are minutely granular, and are separated by continuous series of minute round scales in single or double rows, and sometimes a minute scale is produced into a short conical spine. The mosaic and regularity of ornament is exquisitely regular. The scales are in rosette centrally, and there are two large and some other scales in the interradi- al space. The radial shields are large, long, separate, broadest and rounded without, and angular and most distant within ; they are convex, elongate pip-shaped, and are granular, and each is surrounded by a mosaic of minute convex scales. They are, moreover, separated by two or three moderate-sized scales, each of which is surrounded by minute ones. Several short, stout, and rather blunt spines are at the margin of the disk ; and they become smaller and more numerous and crowded in the interbra- chial space, towards the mouth-shield.

The mouth-shields are small and granular; they are broader than long, rounded without, angular within, where a reentering curve slopes to the rounded, but angular, sides. The madreporic is the largest. The side mouth-shields are large, and rather long and rectangular in shape; they reach on to the lower arm-plate.

The jaws are broad and short; the mouth-papillæ are large, thin and rounded, and there are six to each angle. Beneath the lowest tooth there is a broad rounded knob separating the papillæ. The teeth are ten or eleven in number, increasing in length and breadth from below upwards; they are straight or slightly guttered within. The jaw-plates are well-defined, and the lowest teeth form a funnel-shaped cavity leading to the close upper ones.

The lower arm-plates.—The first is rudimentary, and is bounded on either side by the very close ends of the side mouth-shields: the second is large, and the general shape is much broader than long; the inner edge is grooved and concave; the outer, the longest, is nearly straight or slightly concave. The sides are slightly incurved for the tentacle-scale, and the corners are slightly rounded. The plates are separate; and the union is by a skin, the side arm-plates not reaching between. Near the tip the plates become longer and are still separate.

The side arm-plates are small, project from the side of the arm, have four short spines on the edge, and a large tentacle-scale which extends along the side of the lower arm-plate. The spine next to the scale is the smallest, and becomes a three-spined hook near the tip of the arm. The spines are conical, broad below, bluntish, are faintly striated, and stand out from the arm. The surface of the lower arm-plates is granular, and there are indications of faint rings of colour on the arms.

The upper arm-plates are surrounded by a row of very small accessory plates, fourteen to eighteen in number; there is a large accessory plate at the side and rather without, where it simulates in size and position part of the side arm-plate; it is bounded, but not externally, by small accessories. The upper arm-plates nearest the disk are small and more or less rudimentary, are broader than long, and they are crowded by the rows of small accessory scales: after the fourth or fifth, the others become large, oval from side to side, and much broader than long. In some specimens one of the edges is often straight. Further

out they become longer than broad and more or less oval, and the small accessory plates diminish in number and cease, but the large side accessories project. Towards and at the tip the accessories are not seen, as they gradually diminish in size, and the side arm-plates separate the upper arm-plates, which become very small.

The tentacles within the mouth are large and stumpy, and those of the arm are longer than the large tentacle-scale. The colour of the whole is light brownish red, and there is a blotch of dark colour on the radial shields and sometimes on the centre of the disk. The arms are dark red-brown close to the disk for a short space, and then they are slightly ringed with alternate dark red and light buff. In some instances the spines in the interbrachial spaces are dark-coloured.

There is much variation in the colouring and marking; and as the animal dries, the colours become lighter, the red disappears and is succeeded by a buff tint.

Locality. Sondai Bay, Korean Sea. Collected by Capt. St. John, R.N.

In the British Museum.

Genus OPHIONEREIS, *Lütken*.

· OPHIONEREIS VARIEGATA, sp. nov. Plate X. figs. 15, 16.

The disk is flat above, circular in outline, and small; and the arms are moderately slender and tapering, and about four or five times the diameter of the disk in length. The colour of the upper part of the disk and arms is purple and light buff. The light tint is in four blotches on the disk, one in each interradial space, and the radial shields have a light mark on them, as have also all the scales and notably the few larger ones. The arms look banded with the light and dark tint; and two or three upper arm-plates are darker than the succeeding one, and have, besides, a longitudinal light area and a little spot near the end, besides lateral purple stripes and tinting. The accessory plates are generally tinted light purple, and some of the spines are banded. Beneath, the colour is light buff; and there is no colour ornamentation until quite at the tip.

The disk-scales are small, numerous, and without order; and the radial shields are very small, swollen, long-oval in shape, and very distant. Beneath, the scaling is distinct and small, and there is no other colour than the common light tint; it reaches close to

the mouth, and is bounded by the ridge of the generative slit on either side; and this is very minutely spined, the row of spines meeting close to the mouth-shield.

The mouth-shields are small, slightly longer than broad, cordiform, angular within, and curved broadly without, the madreporic being rounder in outline. They are remote from the margin of the disk, and are attached aborally to the process of the converging generative slits. The side mouth-shields are rather large, bound much of the mouth-shield, are narrow and united at their inner edge, and rather broad and triangular near the lower arm-plate.

The jaws are short, and together they form almost a semi-circle, instead of an angle, and are broader than long. There are eleven mouth-papillæ to each angle; the last but one, externally, is the largest, and that at the angle resembles a small true tooth; those on either side project, but are rather blunt. The teeth are broad, and rather square at the free edge, and are five in number.

The under arm-plates vary slightly in shape, and those in mid arm are very broad aborally, rather angular within, but still, on the whole, are longer than broad. There is a slight curve aborally, where the plate forms not only the under arm, but encroaches on either side: there is a re-entering curve on either side for the tentacle, and then the sides slope sharply inwards, and the oral edge is short and approaches a point, or the oral portion of the plate may present a sharp and narrow curve.

The side arm-plates encroach by a blunt process upon the under surface, and produce the angularity of the under plates, but they do not separate them entirely.

The upper arm-plates overlap, are broader than long, and have a broad curve aborally and a faint longitudinal ridge; they are convex from side to side, broadest and least curved within, and the sides slope inwards from the oral edge. There is an accessory plate on each side, and it is broader and curved without and angular within, being close to the side of the upper arm-plate, and not projecting beyond its bold distal curve.

The side arm-plate has a narrow process which reaches slightly towards the median line beyond the accessory piece, which is pretty constant to the tip of the arm. The side arm-plates are small, form much of the side of the arm; they are rather thick, project slightly from the arm, and their free edge, which supports

three small spines, is rather thick. The spines are short, rather stout; the middle one the largest, blunt, with a small base of attachment, and it rarely surpasses the upper arm-plate in length. The tentacle-scale is large and oval in shape.

Locality. Korean Straits, 33 fathoms. Collected by Capt. St. John, R.N.

In the British Museum.

OPHIONEREIS DUBIA, Audouin, sp., var. *SINENSIS*, nov.

This Ophiuran species was delineated with great exactitude by Audouin in Savigny's 'Descr. de l'Egypte,' 1809, pl. 50; and afterwards it was termed *Ophiolepis dubia* by Müller and Troschel, 'Syst. Asterid.' p. 94. Subsequently Lyman placed it in the genus *Ophionereis*, and termed it *Ophionereis dubia*, Lyman. The credit of discovery and of accurate representation clearly belongs to Audouin in the first instance.

Lyman states that the specimen figured doubtless came from the Red Sea, as the species is not found in the Mediterranean.

The form from the Korean Sea is well grown, and differs from the type as follows:—The lower arm-plates have a median notch and eminence; the spines are subequal, and they are rarely banded with colour. It has a marsupium, and doubtless, as was commonly the case in these Korean species, it was viviparous.

Locality. Korean Sea, with *Ophionereis variegata*, nobis. Collected by Capt. St. John, R.N.

In the British Museum.

Genus AMPHIURA, Forbes.

AMPHIURA LÜTKENI, sp. nov. Plate X. fig. 17.

The disk is tumid, swollen at the sides, and slightly constricted in the interbrachial spaces. It is covered with very small, subequal, overlapping scales, which are still smaller beneath.

The radial shields are small, long, and narrow; broader aborally, where they approach and sometimes touch, smaller and separated by a mass of scaly derm within, where they are more or less overlapped by scales.

The mouth-shields are somewhat diamond-shaped, about as long as broad, angular without and at the sides, and well-rounded within; the madreporic is the largest and is almost circular in outline. All are continuous aborally with a furcate

process, on the sides of which are the generative slits, and all project orally so as to be very close to the jaws. The side mouth-shields are very small, narrow, and triangular; they are separate within, and form a blunt process on the edge of the lower arm-plate without.

There are four mouth-papillæ to each jaw-angle; and there is an upper tentacle-scale, on either side, with its top close to the jaw. The inner pair of mouth-papillæ are separate, large, pineapple-shaped with a point, and their attachment to the jaw is somewhat constricted: the outer pair are subspinous, long, compressed, often bent, and project downwards, being attached close to the junction of the jaws and the side mouth-shields. The jaws are short, stout, straight, and parallel; and the teeth are large, broad, short, and rather square at the edge. The tentacles of the oral apparatus are large and long.

The first lower arm-plate is very small and rudimentary; and the second to the fifth, which are covered by the disk, are longer than broad, rectangular, with the corners rounded; the inner and outer edges are slightly slanting, and the plates are slightly separate. In mid arm the plates are longer than broad, slightly swollen at the sides, straight without and also within, where there is often a faint notch or a re-entering distal curve. Towards the end of the arms the plates are longer, more swollen at the sides, and rather constricted within and without from the inward extension of the side arm-plate.

The upper arm-plates are broader than long in mid arm, and rather longer than broad near the disk and at the end. The first is small, and about as long as broad; it is heart-shaped, and the distal curve, the largest, is bold, whilst the opposite end is more angular; the second, overlapped slightly by the first, is longer and larger, as are the third and fourth; their greatest breadth is orally, where the broad curve is. A faint longitudinal coloured ridge is seen near the outer edge. The plates gradually increase in size, and become broadly oval in shape; and the side arm-plates, large on the side of the upper part of the arm, only permit them to touch by a small edge. At the end of the arm the plates are broadly curved without, and rather small and angular within.

The side arm-plates are large, and form much of the tall sides of the arm and part of its upper surface, although they do not absolutely meet until close to the end. Their free edge does not

project much ; but its vertical dimensions are considerable, and the plates are separated by skin. The spines project at right angles to the arm from the free edge, and are short, stout, flattish, constricted at their attachment, swollen in the middle, and bluntly pointed. Near the disk there are six spines, the upper and lower ones projecting upwards and downwards respectively, and the others regularly radiating. The longest, which is either the third or fourth from above, is about the length of the upper arm-plate. Lower down the arm there are four spines, and three at its end, whose tips are less projecting.

There is one tentacle-scale, which is large, rounded, and flat, situated on the side arm-plate ; and the tentacles are very long.

The colour of the disk is slaty, and of the arms reddish brown with lighter-coloured under arm-plates. The disk is $\frac{1}{10}$ to $\frac{1}{5}$ inch long, and the arm is about ten times as long. They are stout, broad, and much curved.

Locality. Korean seas. Collected by Capt. St. John, R.N.
In the British Museum.

AMPHIURA KOREÆ, sp. nov. Plate X. figs. 18, 19.

The disk is flat above, tumid, and constricted in the interbrachial spaces and rather thick ; and the arms are broad, not much more than twice the length of the diameter of the body, arched above, flat below, and furnished with three small spines and two tentacle-scales. The upper surface of the disk is covered with scales of several sizes ; there is a small rosette of middle-sized scales, and there is much small scaling in the interbrachial spaces, and the scaling of the lower part is equal and not very fine.

The radial shields are small, much longer than broad, and are completely separated by three disk-scales.

The mouth-shields are heart-shaped, longer than broad, rounded and longer without, very angular and pointed orally, with outwardly curved inner edges. The side mouth-shields are large, united, and thick at their inner edge, long, broad, and triangular, broader towards the lower arm-plate, and much in contact with the mouth-shield. The jaws are small, short, thick, close and straight ; there are six mouth-papillæ on each angle, and an upper sharp tentacle-scale on either side. The two papillæ beneath the teeth are large, lumpy, and blunt, rectangular in shape, with the

corners curved and constricted at the jaw ; the next is broad, curved, and often produced into a slight spine, and the outer one is broader, short and thin, like a ridge ; and by its junction with that of the next angle, a sharp margin is formed as a boundary to the jaw space.

The first lower arm-plate is small, and the others are about as broad as long, broadest without, where the edge is faintly incurved, and angular within, where the edge is short from the incoming of the large side arm-plates. The side near the distal end is straightish and bears a tentacle-scale, and then it slopes inwards orally. Towards the end of the arm the plates are small, longer than broad, curved without, and more angular within, and are separated by the side mouth-shields.

The upper arm-plates are short, large, convex from side to side, much broader than long ; they are strongly curved within, and nearly straight aborally, and towards the end they become separate and more pointed orally.

The side arm-plates are well developed, and have a thin inferior process between the under arm-plates, and a larger, which extends on the upper arm : they begin to encroach soon, and are in contact, at the tip of the arm, separating the lower plates. They project very slightly, and three short, slender, sharp spines arise from the free edge ; these are smaller at the base, thin, slender, round in transverse outline, and are about the length of an arm-plate. A large tentacle-scale, rounded and broad, is on each side arm-plate, and is in contact with that of the lower arm-plate. The colour is white ; the arms are curled downwards, and their length is about twice that of the diameter of the disk.

Locality. Korean Straits, 37 fathoms. Collected by Capt. St. John, R.N.

In the British Museum.

Genus *HEMIPHOLIS*, *Agass.*

HEMIPHOLIS MICRODISCUS, sp. nov. Plate X. figs. 20, 21, 22.

The disk is small, constricted at the interbrachial spaces ; and the arms, about eight times as long as the diameter of the disk, are long and tapering. The upper surface of the disk has thin overlapping scales of several sizes, and there are faint indications of a rosette. A numerous series of smaller scales is in the midst of the interbrachial space above, and there are smaller ones on either side ; and five radiating lines of longish scales pass between

the radial shields, separating them centrally. The radial shields are long, slightly curved, broad without where they join, narrow within where they are separated by three scales and are rather smaller. The disk is naked below; and the generative slits are large and long.

The mouth-shields are small, longer than broad, and heart-shaped; they are angular orally, and well curved without, and the madreporic, the largest, has a furcate process externally. The side mouth-shields are large, triangular, narrow at the inner edge, where there is incomplete junction, curved within, and large and expanded at the arm.

There are four mouth-papillæ to each angle; the innermost two under the teeth, are large, blunt and long; and the others are long, spiniform, with a narrow base of attachment, and sometimes their base is broad, and there is a division into two. There is a sharp spiniform upper tentacle-scale on either side. The jaws are rather separate without, stout and short.

The lower arm-plates are longer than broad, very slightly curved without re-enteringly, and the corners are rounded. The sides are nearly straight, and they slope towards the median line orally. The inner edge is short, and soon becomes angular.

The upper arm-plates are broader than long, slightly curved without, and with a broad and rounded angle within. The side arm-plates are well developed; and there are four short arm-spines, of which the upper and lower are the thinnest, and the others are stouter and blunter. They stand out radially, and have a narrow base of attachment, a broad lower part, and a tapering end, and they are striated and rough. Towards the end of the arm the spines are more slender and spiculate, and they are there usually three in number.

The arms are about nine times the diameter of the disk, whose diameter is $\frac{1}{10}$ inch. The free edges of the side arm-plates are wide apart, and naked skin exists between them on the side of the arm.

There are two small rounded tentacle-scales close together, one on the under arm-plate and the other on the side arm-plate.

Locality. Korean Straits, 51 fathoms. Collected by Capt. St. John, R.N.

In the British Museum.

Genus *OPHIACTIS*, *Lütken*.

OPHIACTIS SEX-RADIA, *Grube* (sp.), *Wiegmann's Archiv*, 1857, p. 324, under genus *Ophiolepis*.

This species was described by Lütken subsequently as *Ophiactis Reinhardtii*, and figured by him in tab. iii. fig. 7, in his essay on the West-Indian and Central-American *Ophiuræ*, p. 263, in noticing the species obtained by the corvette 'Galathea' from Nicobar and Tahiti.

The Korean specimen evidently belongs to this species; and thus the known distribution is from Zanzibar, Nicobar Islands, Korean seas, Sandwich Islands, and south to Tahiti.

Locality. Korean seas. Collected by Capt. St. John, R.N.

In the British Museum.

OPHIACTIS AFFINIS, sp. nov. Plates X. & XI. figs. 23, 24.

The disk is circular in outline, without arm-notches; there is a medium-sized, circular, flat scale in the centre, around this a number of others, which are smaller, forming an indefinite rosette; and a band of irregular-shaped scales passes outwards in each interradial space, with one or two rows on either side of smaller scales. The radial shields extend halfway to the centre, are separated by two scales, the outer of which is long and narrow, and the inner, producing the greatest amount of divergence, shorter and broader: the shields are nearly in opposition over the arms, and separated within; they are rather covered at the margins by the scales of the disk, and are long, narrow, and broadest without. The scales of the margin of the disk carry a few separate, rather wide apart, stout, short spines; there are more on the top of the disk, but in the interbrachial spaces below the scaling is small, and the spines become crowded, small, very short, thin, and numerous.

The oral structures are small; and four or five of the broad lower arm-plates are within the range of the disk.

The mouth-shields are small, triangular, very slightly broader than long, broad, and slightly rounded aborally, where there is attachment to a process continuous with the sides of the generative slit, bluntly angular, or more or less rounded within, and produced at the sides. The madreporic plate is rounded and larger than the others. The side mouth-shields do not meet within, but are large, triangular, with rounded edges, and are at the oral side of the mouth-shield; they unite with their neighbours on the under part of the first arm-plate.

The oral slits are large and wide; the jaws are slender and separate near the mouth-shield, and broader at the plate, where the broad teeth are attached. These are four in number, and the lowest has a re-entering curve to its free edge. There is a mouth-papilla, long, lamellar, rather produced downwards on the edge of the jaw close to the side mouth-shield; and beneath the true teeth there is a small broad lumpy papilla, somewhat resembling them, but much smaller in size.

There are five arms, which are about three or four times as long as the diameter of the disk; they are broad, and ringed with dark grey and green colour, especially above. The lower arm-plates are broader than long, broadest without, where there is a slight rounding or nearly a straight edge, narrower, but still wide within; and the sides are either rounded, to give an elliptical appearance to the whole, or are straighter, slanting decidedly near the oral edge of the plate. Towards the tip of the arm the shape becomes hexagonal, and the outer edge is nearly straight and broad, the inner being very short.

The upper arm-plates, on mid arm, are nearly twice as broad as long, overlapping, well rounded within, less so, or nearly straight-edged without, the sides being sharply curved, the whole being irregularly elliptical. At the tip they are longer and triangular, with the point within. They form much of the upper surface, even at the tip.

The side arm-plates are large, extend on the top of the arm in a broad process between the sides of the successive upperarm-plates, are flap-like, and stand out from the arm at the sides, and encroach more or less short of separating the lower plates below. Some have an accessory small spine at the edge of the plate above, towards its end near the median line; and all, except near the tip, have four short, radiating, rather wide apart, blunt spines on the edge. The lowest spine is the smallest, and the next is usually blunter and larger than the others. There are three spines near the tip. The longest spines are about the length of an arm-plate.

The tentacle-scale, one on each side, is large, oftentimes nearly as long as the lower arm-plate; it is narrow where attached, and broad and rounded slightly where free, and the length exceeds the breadth.

The diameter of the disk is $\frac{1}{8}$ inch. The bands on the arm are broad, and the dark grey-green tint occupies one or two upper and side arm-plates; then there is the usual greenish-buff tint on

two, three, or more before the next band. In some parts many plates are covered longitudinally with a stripe of the green tint. The edges of the radial shields and some of the scales of the disk are tinted with the dark colour, but the traces of it below are slight.

Locality. Korean seas. Collected by Capt. St. John, R.N.
In the British Museum.

Genus *OPHIACANTHA*, *Müll. & Troschel.*

OPHIACANTHA DALLASII, sp. nov. Plate XI. figs. 25, 26, 27.

The disk is small, pentagonal, and contracted in the inter-brachial spaces. The radial shields are entirely hidden; but their outlines, long and narrow, can be traced beneath the covering, which, like that of the rest of the disk, is ornamented with microscopic stumps, each terminating in three wide-apart sharp thorns, there rarely being two and four terminal ones; stumps slightly larger in the centre of the disk.

The under surface of the disk is covered to the outer edge of the mouth-shields with the same texture, the thorned stumps being small and crowded. Each stump is on a rounded base, the aggregate of which form the membrane of the disk.

The mouth-shields are very small, heart-shaped, angular within, rounded without, and longer than broad; they are marked with a central splash of purple colour.

The side mouth-shields, much larger than the mouth-shields, are nearly united within, and extend on either side outwards beyond the broadest part of the mouth-shield, and come in broad contact with the first side arm-plate. These side shields are broad from side to side, and their inner edges long, are shorter than the outer, where the shield is largest; their outer edge partly bounds the generative opening. The jaws are short and broad from side to side, so that the angle is not a very acute one. The mouth-papillæ are seven on each angle; the inner one, below the teeth, is markedly larger and longer than the others, and it is somewhat in the shape of a long sharp fir-cone. The next and neighbouring papillæ are more spiniform, and the most external on either side are broader and shorter than the others. The teeth are four to each jaw, and they are longer than broad, and flat, rounded within.

The arms are about six times as long as the diameter of the disk, and are very nodose in appearance from the swollen nature

of the side arm-plates, close to their outer free edge. The arms taper rather suddenly, and are bent downwards after death, giving a very spidery look to the form.

The first under arm-plate is small, longer than broad, broadest within, where there is a slight re-entering curve in the midst of a convex inner border, and much narrower distally, where there is a rounded process separating the side mouth-shields, and terminating close to the junction of the first side arm-plates on the arm.

The second under arm-plate is much larger than the first; it is broader than long, projects slightly, and is broadly heart-shaped in outline. The inner part is angular, and the outer broadly curved, and the angular sides are rounded. The next arm-plate, separated by well-developed side arm-plates, which meet longitudinally along a straight line, is less angular orally; and the fourth arm-plate, much broader than long and smaller on the whole, has its sides slightly straighter than those already mentioned. The succeeding under arm-plates are smaller, have the sides straighter, and the distal curve is less developed than the oral. At the tip of the arm the lower plates are much smaller and widely separate, their sides are straight for a short distance, the curve is more intense without than within, and the whole is still broader than long.

The upper arm-plates are widely separated, small, slightly broader than long, angular within, faintly re-enteringly curved at the sides and well rounded distally. They are convex above. Near the tip of the arms they are strongly rounded without, and very convex above from side to side and from within externally.

The side arm-plates are strongly developed, and constricted proximally; each gradually swells out laterally, broadly, and also superiorly, so as to include the upper arm-plates in a considerable nodosity, which is only lateral inferiorly. They unite above, as below, in straight median lines, and the result is that a side view of an arm presents a tolerably straight condition of the lower surface, and a wavy edge of alternate depressions and rounded projections of the upper surface.

The free edge of the side arm-plates, rather stout and projecting at the side of the arm, gives origin to four sharp, glassy spines as well as to a minute spinulose tentacle-scale. The spines are shorter than a joint, are spear-like, striated longitudinally, and are minutely serrate; the upper are the largest and longest, and sometimes a fifth exists near the disk. The texture of the arm-

plates is granular, minute glassy-looking granules being separated by a more opaque development.

The specific characters are the minutely bifurcate or trifurcate thorned condition of the upper and lower surfaces of the disk, the great side arm-shields, the nodose condition of the upper part of the arm, the great development of the side arm-plates, the four sharp spines, and the minute tentacle-scale.

The species represents *Ophiacantha stellata*, Lyman, from Barbadoes, 100 fathoms (Illust. Catal. Harvard Coll., No. 8, ii. p. 11). It differs from *O. indica*, Lym.

Locality. Straits of Brea, 50 fathoms. Lat. 38° 19' N., long. 129° 7' E. Collected by Capt. St. John, R.N.

GENUS OPHIOTHRIX, Müll. & Troschel.

Numerous specimens of a species and its varieties which belong to this genus are amongst the dredgings brought from the Korean seas by Capt. St. John, R.N. They all have numerous slender, long, serrate, and usually glassy spines on the arm, a broad under surface to the arm, disunited side mouth-shields, and a disk whose colour and armature are exceedingly variable. The specific peculiarities and the curious amount of variability have been determined after the examination of about eighteen specimens.

OPHIOTHRIX KOREANA, sp. nov. Plate XI. figs. 28, 29, 30, 31, 32.

The disk is usually circular in outline, and rarely pentagonal; it is rather thick, flat above, and swollen at the interbrachial spaces. The radial shields are longer than broad, narrow and rounded within, and broad without, where there is a short rounded projection over the arm. Closer without than within, they are often slightly separated by dermal tissue. Their outer margins are sunken, as it were, and rounded, and their surface is covered with a skin which supports a very few stumps, which may nearly be covered by them, and which may have spinules and even a short spine or two upon the surface. The stumps are swollen at the base, constricted in the cylindrical portion, and are armed with three sharp, slender, wide-apart thorns. The thorns are rarely two and four in number. The spinules are longer than the stump, and have longer thorns. The spines are glassy, slender, and toothed at the side.

The rest of the upper surface of the disk is crowded with stumps,

resembling those of the radial shields ; and there are spines and spinules, in some specimens, near the centre.

Towards and on the interbrachial spaces, reaching in a triangular patch on to the under surface, are spinules, which become crowded inferiorly. They are slender, with swollen bases of attachment, and have long trifold thorns.

There is a reddish tint on the centre and in the interradi al spaces, and it also sometimes encircles the whole disk as with a narrow band. The tips of the stumps and spinules are often red. The disk is covered with skin, under which traces of scales may sometimes be seen ; and below the disk is naked beyond the patch of spinules.

Inferiorly, the disk-membrane joins on by two plates to the distal joint of each mouth-shield : the generative slits are large, and the generative plates are broad and large and very visible at the side of and above the arms.

The mouth-shields are small, broader than long, diamond-shaped, rounded at the sides, angular within and curved without, where there is union with the edges of the generative slit. The oral edges are slightly re-enteringly curved. The madreporic shield is elliptical and the largest.

The side mouth-shields are rather large ; they are narrow at their inner edge where they do not unite, and they are broad and triangular where they are in contact with the first lower arm-plate. Their oral edge is curved, with the concavity towards the jaws.

The pairs of jaws are slender and are widely separate, and each jaw of the separate angle is distinct near the mouth-shield.

The tooth-papillæ are in a very long narrow oval ; they are small, and crowded in a row of six or more inferiorly, and become gradually larger above until they approach the true teeth. Within the edge of the oval thus formed there is a well separated mass of tooth-papillæ in two rows, and they are larger than those around. The number of papillæ is variable.

The teeth are narrow, flat, slightly rounded, and sometimes have a boss on the free end ; they increase in size upwards, but the highest is sometimes smaller than the others. There are five in all.

The lower arm-plates increase in size from the oral ring to where the arm is well free from the disk, and they retain a considerable dimension until the terminal third, where they decrease gradually. Their typical form is slightly broader than long,

broader without than within, with sides sloping inwards. The distal edge, wider than the other, is broadly curved, the convexity pointing orally; its angles are cut off and rounded; there is a re-entering curve at the sides, and the proximal edge is grooved, the concavity looking orally. The plates are rather separate and united by skin, and they are rather flat, and form the bulk of the under surface. They are usually without any special tint other than the light brown of the whole, but in some there is a pinkish line on either side close to the edge. At the tip of the arm the plates are longer, less incised, and are closer together.

The upper arm-plates are close, longer than broad, angular orally, with a straight edge there, and they are boldly rounded distally. They slope on either side from a median faint central ridge, which ends at the rounded extremity in a faint nodule. The sides slope to the angle, and are overlapped by the side arm-plates, and one upper arm-plate slightly overlaps that next to it. Near the tip the length of these arm-plates increases over the breadth. A white longitudinal line with a red or purple one on either side, of greater or less breadth, is often to be seen.

The side arm-plates are well developed, and stand out from the arm, forming with the connecting-skin much of the side-arm. Below the free edge extends outwards on a level with the surface of the under arm-plates, and supports short spines and the small tentacle-scale. Above, the inner end of the side arm-plate is prolonged into a short angular process with a curved margin, which overlaps and to a certain extent separates the upper arm-plates. This process has one or more long spines on its surface, and the others are on the free edge of the plate, where it forms the side of the arm. The plates extend on the under surface of the arm, but do not meet, and are broad enough to place the tentacle-scale well without. The scale is small, largest at the base, and minutely thorned.

The spines near the disk are numerous, and they vary from 9 to 12; further on they diminish to 7, 5, and 3 in number.

The spine next to the tentacle-scale is the smallest, and is a mere spinule, with a sharp thorn on the plates nearest the disk and for some distance, but soon the thorn becomes bent and a second one forms on its side, and there is a boss-like prominence below and near the origin. This two-toothed and curved hook increases in size towards the end of the arm, is glassy, and points orally. Sometimes there are three teeth. The next spine is slightly larger, is flat, tapering, serrated and striated, and often bushy at

the broad top, or its top may be sharp. Sometimes the denticles on the side are long enough to simulate hook-processes. The third is slightly larger, and the others increase in length and size, the maximum being reached on the shoulder of the arm, and before the process of the side arm-plate is reached. Occasionally on the top of the arm and on the extremity of the side arm-plate there is a smaller needle-shaped spine without denticulation. The spines as a whole are flat, striated, many-toothed, and end with a sharp brush of thorns, or are blunt and rarely simple at the termination. All have a distinct boss-like base, and are glassy when young, and more opaque when old and dry.

The specimens present the appearance of having been viviparous. The diameter of the largest disk is $\frac{3}{10}$ inch, and its longest arm is one inch in length.

Locality. Korean Straits, 23 fathoms. Collected by Capt. St. John, R.N.

In the British Museum.

Variation. The disk is sometimes pentagonal in outline. The whole of the disk is sometimes covered with a crowd of stumps and the radial shields also, but the spinules appear in the interbrachial space and have three long thorns.

No derm is seen in some specimens separating the radial shield from its fellow.

In young forms, the spines are shorter, sharper, with fewer teeth, and are sometimes not quite straight; the tooth-papillæ are not so numerous, the under arm-plates are longer and less curved without, and there are fewer spines on the side arm-plates.

This variable species is allied to *Ophiothrix spiculata*, Le Conte, and is the representative of *O. violacea*, Lk.

OPHIOTHRIX KOREANA, variety, sp. and var. nov.

The disk is circular in outline, and the interbrachial spaces below are very tumid and project, being tinted at the edge pale green, nearer the margin light red. The disk is coloured light reddish brown, and the numerous short trifid stumps on it are of a dark red colour. The arms are light red and violet in tint, and there is a light streak with darker colour running down the upper arm, the darker tint spreading. There is a line of dark tint on the under arm on either side. The stumps on the disk are separated and not crowded, and those on the interbrachial space are longer and not coloured, being trifid and glassy. The spines are seven or more towards the base, largely thorned and

glassy, and they are slender and long. The hooks are large, with two sharp processes, and are blunt. This is a young form of a variety of the last type.

Locality. Korean seas. Collected by Capt. St. John, R.N.
In the British Museum.

Genus OPHIOTHELA, *Verrill*.

(Notes on Radiata, Trans. Connecticut Acad. vol. i. part 2, page 269.)

Verrill has described a species *Ophiothela mirabilis*, and Lyman gives a drawing of the side-arm of a specimen (Illust. Cat. Harvard College, No. 8, ii. 1875, page 34, pl. iv. fig. 60). The species is from Panama Bay, Pearl Island.

Lyman has described a species *Ophiothela tigris*, probably from the Pacific (Illust. Cat. Harvard College, No. vi. page 10, pl. i. figs. 10-12, 1871); and Lütken has described *Ophiothela isidicola* from the Eastern seas (Ophiurid. nov., Overs. K. Danske Vidensk. Selskabs Forhand. 1872, pp. 92 & 107). Numerous specimens of this species were obtained by Semper from the Philippines, and are now in the Museum of Comparative Zoology at Harvard College.

A specimen which must be referred to this genus is amongst the collection of Ophiurans from the Korea, and instead of clasping some kind of *Isis* or any zoophyte, it clings to the arms of a blunt-spined *Amphiura*. Its habits are evidently those of the forms already described, and its flap-like side arm-plates, the well-developed hooks, and the skin-covered arms ornamented with rounded masses of carbonate of lime, the six arms and corresponding large close radial shields, bring it clearly within the genus. From Lyman's plates the Korean form differs, and it would appear to differ from the other species. I have some forms from the Red Sea which are closely allied to that now under consideration; and they all form a group characterized by the regular ornamentation of the disk, with short, thick, knob-shaped spines, having a broad foundation, the regular boss ornamentation of the upper arm and the semiglobose condition of the mouth-shields, and the presence on the distal free edge of the side mouth-shield of a club-shaped spine.

OPHIOTHELA VERRILLI, sp. nov. Plate XI. fig. 33.

The disk is rather thick, and the radial shields covered with a minutely and sharply granular skin. They have numerous very

distinct, irregularly placed, knob-shaped spines on them, which are not quite globose, having a blunt tip; they are minutely thorny at the top, and have a rather constricted peduncle and a broadish defined expanded base. The centre of the disk, where the shields do not reach, and the linear interradiial spaces bear larger spines, six or seven in the centre and three or more elsewhere, but all have the same knob-shape and minutely spiny surface. Some on the interradiial spaces are slightly elongate, and a large one is usually at the margin. The interbrachial space below and at the sides is ornamented with several of these spines. The generative plates are large and distinct. The upper surface of the disk contrasts with the skin-covered interbrachial regions. The mouth-shields and side mouth-shields, although fused and covered, are seen to be large. The distal end of the mouth-shield is globose; and the side mouth-shields, broad orally, are ornamented by a slender, downward projecting, club-shaped spine, sometimes forked close to the generative slit. The side mouth-shields do not unite externally, but only reach the under arm-plate.

The jaws are short, rather separate, parallel, rather swollen high up in the region of the upper tentacle, where there is a rounded spiny process. There are ten tooth-papillæ on an oval mass; and the angle is large, and projects rather downwards. The tentacles are long and large.

The under arm-plates are covered with a delicate skin; but the plates are visible and are separate, rather hexagonal, broadest without, where there is a notch, and angular orally, the line within being slightly notched. The outer angles are rounded, and the sides slope in straight. There appears to be a median depression, and the outer angles are swollen.

The skin on the upper arm-plates usually hides them, but they are rounded rather angularly distally. A series of solitary median large bosses passes down the arm, and two or three smaller ones are in a transverse line between them. These last do not exist at the tip, where the large boss is very distinct.

The side arm-plates have the characters of those of the genus; they are minutely granular at the sides and swollen, but there is no special ornamentation or keeling. The upper spine of the five is small and rugged, the next is larger and longer and often spiculate, the third is the largest and is denticulate within, and the others become strong hooks with the points looking orally down the arm. There are no tentacle-scales, and the long tentacles

come out from the side of the arm. The arms are about twice and a half as long as the diameter of the disk, which measures $\frac{1}{10}$ inch.

Locality. Korean seas, on *Amphiura*. Collected by Capt. St. John R. N.

In the British Museum.

IV. *Remarks on the Species.*

The first species of *Ophioglypha* (*O. Forbesi*) described is very anomalous from some points of great affinity to the genus *Ophiomusium*. The mosaic of the disk, the long almost connected mouth-papillæ, the meeting of the side arm-plates above and below, and the small size of the upper and lower arm-plates would connect the form with Lyman's genus *Ophiomusium*. But the papilliferous radial scales and generative plates, and the presence of a tentacle-scale and minute tentacle far out towards the tip, are not characters of that genus. The species is aberrant from the typical *Ophioglypha*, on account of the oral structures especially; and the disk scaling is to a certain extent abnormal. It is an interesting form, for it throws a light on the value of *Ophiomusium* as a genus. Its species as yet are remarkably widely separated, and it must be acknowledged that its characters are very embryonic. For the literature of *Ophiomusium*, see Bull. Mus. Comp. Zool. Harvard Coll. Cambridge, U.S., vol. i. No. 10, page 322. See also Wyville Thomson, 'Depths of the Sea,' vol. i. p. 172; 'Voyage of Challenger,' vol. ii. p. 67.

Ophioglypha striata, so called from the remarkable groovings on the side arm-plates, is also characterized by the structures about the notch of the disk, and the curious shape and spinulation of the first two or three upper arm-plates.

Ophioglypha sculpta is clearly an ally of *O. Stuwitzi*, and the furrowing and dotting of some of the scales and plates is very characteristic. The spiny condition of the first upper arm-plate is to be noticed.

Ophioglypha Sladeni is characterized by the accessory spine on the body of the side arm-plate, by the numerous spines near the disk and their irregular length, and the bossed disk scale.

Ophioglypha sinensis, Lyman. Numerous specimens of this rather aberrant *Ophioglypha* were dredged up. The scaling of the disk differs from that of all the other forms in the Korean seas.

Ophiolepis mirabilis. This common species has the disk of *Ophiolepis* as diagnosed by Müller and Troschel, that is to say

the scales, which are of good size, and the large radial shields are environed by rows of small scales as by belts. But the upper arm-plates have also the supplementary rows of small scales around them, and there are also large accessory side pieces. Moreover there are hooks on the side arm-plates. This mixture of Ophiolepidian and Ophiopholian characters is very interesting; and this species, I consider, renders the abolition of *Ophiopholis*, as a genus, inevitable.

Ophionereis dubia is represented by a variety in the Korean collection; and the distinctions between the variety and the type have been already noticed.

Ophionereis variegata is allied to the species *O. annulata* from Panama, but the arrangement of the side arm-plates, of the accessory plates, and of the mouth-papillæ differs. There is a manifest resemblance to *O. squamata*, Kinberg, from Honolulu; but the shape of the under arm-plates and the arrangement of the radial shields differs; and the resemblance is less to *O. crassispina*, Kinberg, from the same island.

Amphiura Lütkeni has small radial shields touching without, and the side mouth-shields are not joined within. There are four mouth-papillæ, two of which are spinous and long, and the inner pair large; there is but one tentacle-scale, and there are six spines near the disk, and four further out. This does not approach in form to any as yet described from the Pacific side of America.

Amphiura koreæ has an oral arrangement of mouth-papillæ, jaws, and side mouth-shields remarkably like that of *A. squamata*, Sars, from the Atlantic and the eastern coast of the United States; but the radial shields differ, and the mouth-shields also; the arms also differ in length. Lyman states that there is a close resemblance between *A. squamata* and *A. tenera*, Lütken, from the West Indies, and *A. pugetana* from California. It is interesting to find this affinity prolonged still further west, in the form of the short-armed species under consideration.

The genus *Hemipholis* of Agassiz contains *Amphiuræ* with the disk naked below; but to this evident generic attribute he added some which are not of generic value, such as limiting the arm-spines to three and the mouth-papillæ to two. In *Hemipholis microdiscus* the two mouth-papillæ near the side mouth-shields are evident enough, but there are two more under the true teeth; moreover there are four spines.

Ophiactis sexradia, Grube, the *O. Reinhardtii* figured by Lütken, is evidently represented in the Korean fauna; and its range is enormous between America and Africa.

Ophiactis affinis so closely resembles an Amphiuran, that were it not for the spines on the margin and on the disk below, the propriety of making this spination any thing more than of specific value may well be doubted. It belongs to a group allied to *O. simplex*, Lütk., and *O. Mülleri*, Lütk., the one from Panama and the other from the West Indies.

The species of *Ophiacantha* is remarkable for the development of the side arm-plates, the nodular condition of the arm, and the small spines. It is a very distinct type.

The *Ophiothrix* is very variable, and belongs to the section with numerous glassy toothed spines, hooks with two claws, and an oval of numerous tooth-papillæ, numbering nearly twenty. Stumps bifid or trifid.

Finally, the *Ophiothela*, closely allied to *O. isidicola*, differs principally in the ornamentation of the disk.

DESCRIPTION OF THE PLATES.

PLATE IX.

- Fig. 1. *Ophioglypha Forbesi*, nobis, from above, $\times 8$.
 2. " " " from below, $\times 8$.
 3. " " " last lower arm-plates, $\times 8$.
 4. *Ophioglypha striata*, nobis, from above, $\times 8$.
 5. " " " side of arm, $\times 8$.
 5a. " " " serrature of side arm-plates, more magnified.
 6. *Ophioglypha sculpta*, nobis, from above, $\times 8$.
 7. " " " from below, $\times 8$.
 8. " " " upper arm-plate, $\times 8$.
 9. *Ophioglypha Sladeni*, nobis, from above, $\times 8$.
 10. " " " from below, $\times 8$.
 11. " " " side of arm showing extra spines, $\times 8$.
 12. *Ophiolepis mirabilis*, nobis, from above, $\times 8$.

PLATE X.

13. *Ophiolepis mirabilis*, nobis, from below, $\times 8$.
 14. " " " side arm-hooks, highly magnified.
 15. *Ophionereis variegata*, nobis, oblique view, part of arm and disk, $\times 8$.
 16. " " " from below, $\times 8$.
 17. *Amphiura Lütkeni*, nobis, oral structures, $\times 8$.
 18. *Amphiura koreæ*, nobis, from above, $\times 8$.
 19. " " " oral structures, $\times 8$.
 20. *Hemipholis microdiscus*, nobis, from above, $\times 8$.
 21. " " " from below, $\times 8$.

- Fig. 22. *Hemipholis microdiscus*, nobis, spines and tentacle-scales of arm, highly magnified.
 23. *Ophiactis affinis*, nobis, from above, $\times 8$.

PLATE XI.

24. *Ophiactis affinis*, nobis, from below, $\times 8$.
 25. *Ophiacantha Dallasi*, nobis, thorns of the disk, magnified.
 26. " " " from above, $\times 8$.
 27. " " " from below, $\times 8$.
 28. *Ophiothrix koreana*, nobis, from above, $\times 8$.
 29. " " " from below, $\times 8$.
 30. " " " spine, highly magnified.
 31. " " " stump from the disk, highly magnified.
 32. " " " arm hook, highly magnified.
 33. *Ophiothela Verrilli*, nobis, from above, $\times 8$.
 34. *Hemipholis microdiscus*, nobis, nat. size.
 35. *Ophioglypha sculpta*, nobis, nat. size.

Descriptions of New Hemiptera. (I.)

By F. BUCHANAN WHITE, M.D., F.L.S.

[Read November 7, 1878.]

THE majority of the insects herein (and probably hereafter) to be described, were taken by my friend Professor J. W. H. Trail during his fruitful exploration of the Amazon region, in 1873-1875; and his localities refer to the country drained by that river and its tributaries. The types of all the species mentioned are in my collection. The subjoined tabular list of two new genera and seventeen new species comprises what is contained in this paper.

<i>Paryphes pontifex</i> .	<i>Velia vivida</i> .
<i>Fibrenus bullatus</i> .	— <i>virgata</i> .
<i>Largus lentus</i> .	<i>Neovelias Trailii</i> .
<i>Ischnodemus inambitosus</i> .	<i>Microvelias mimula</i> .
<i>Pamera pagana</i> .	<i>Hydrobates regulus</i> .
<i>Lethæus lepidus</i> .	<i>Limogonus ? lotus</i> .
<i>Helenus hesiformis</i> .	— ? <i>lubricus</i> .
<i>Acanthocheila abducta</i> .	<i>Pelocoris procurrens</i> .
<i>Hydrometra metator</i> .	

COREIDÆ.

1. PARYPHES (SUNDARUS) PONTIFEX, n. sp. Supra et subtus cum antennis pedibusque æneo-viridis; lobo postico pronoti scutelloque croceis; hemelytris atris opacis, corii marginibus angustis costali apicalique, et commissura clavi flavescentibus; membrana nigro-brunnea;

Fig. 3

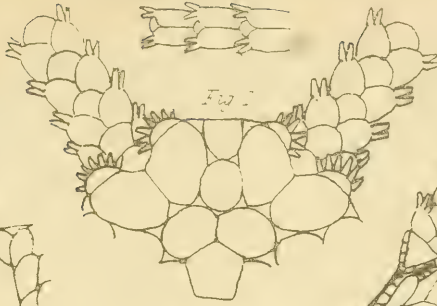


Fig. 4



Fig. 1



Fig. 2

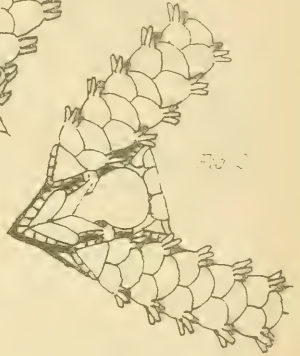


Fig. 8



Fig. 7

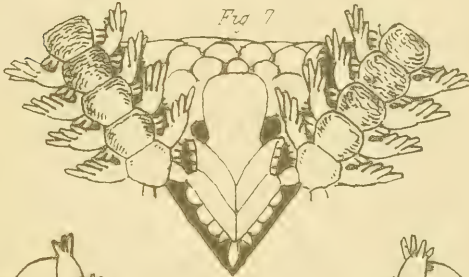


Fig. 9a



Fig. 9b



Fig. 6



Fig. 10



Fig. 11

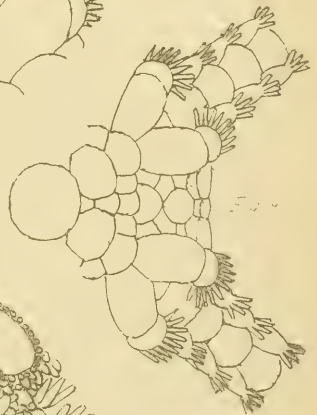


Fig. 12

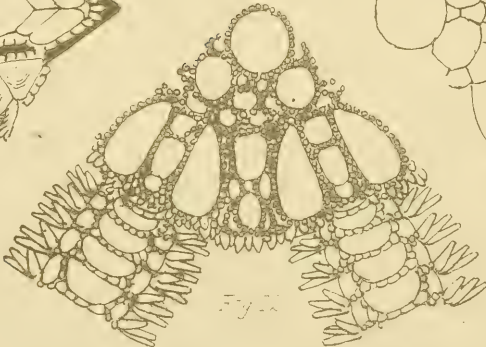


Fig 15

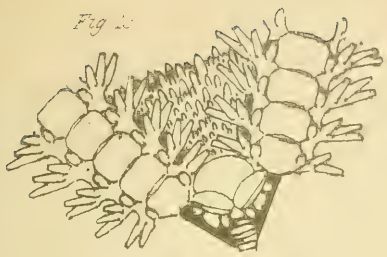


Fig 16

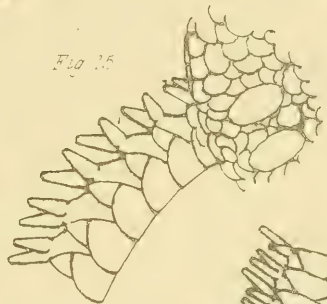


Fig 21

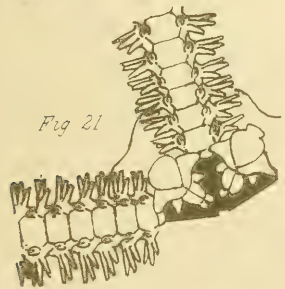


Fig 18

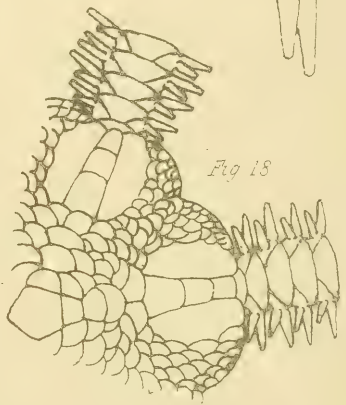


Fig 14

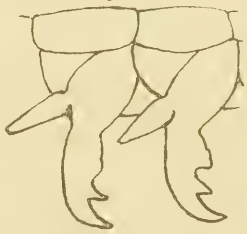


Fig 20

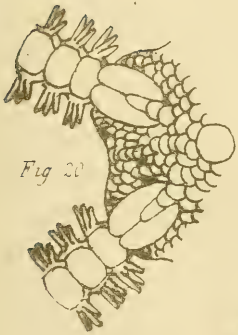


Fig 20

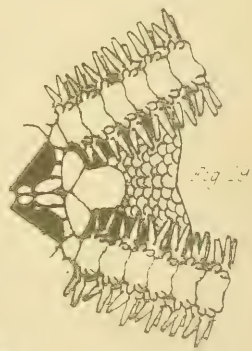


Fig 18

